UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 10/591,215 | 08/30/2006 | Thomas J. Adamo | 6050.005.001 | 7889 |

4617 7590 12/10/2009

LEVISOHN, BERGER , LLP
11 BROADWAY , Suite 615
NEW YORK, NY 10004

| EXAMINER | |
|---|---|
| GEBRIEL, SELAM T | |
| **ART UNIT** | **PAPER NUMBER** |
| 2622 | |
| **MAIL DATE** | **DELIVERY MODE** |
| 12/10/2009 | PAPER |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| Office Action Summary | Application No. 10/591,215 | Applicant(s) ADAMO ET AL. | |
|---|---|---|---|
| | Examiner SELAM GEBRIEL | Art Unit 2622 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *27 August 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *08/30/2006 and 08/27/2009* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

## DETAILED ACTION

### *Response to Arguments*

1. Applicant's arguments with respect to claim1 have been considered but are moot in view of the new ground(s) of rejection.

### *Claim Rejections - 35 USC § 103*

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. **Claims 1 – 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tangen et al. (US 6,765,617 B1) cited by applicant in view of Okayama et al (US 2007/0091197A).**

**Regarding claim 1**, Tangen disclose a nano -imaging apparatus (Figure 1a,1b, 2a – 2c , 3a and 3b) comprising multiple optical elements of sub-micron (Figure 1b Micro lenses $L_1 – L_4$) supported onto a partly or fully radiation transmitting layer (Figure 2a - 2c, Col 9 lines 24 - 28, the lenses are supported onto a curved transparent substrate S), which in turn is situated on top of a radiation sensitive layer (Figure 2a – 2c Backplane P) being patterned so that under each of said optical elements (Figure 1b Micro lenses $L_1 – L_4$) there exists at least more than one radiation harvesting element (Figure 1b Detectors $D_1 – D_4$) that may be individually affected by radiation (Col 9 Lines 24 – 28, "The optically active structures or the lenslets L may be provided as in FIGS. 2a-2c, where FIG. 2a shows lenses L on a curved transparent substrate S and assigned

detectors $D_n$ provided on the backside of the substrate such that they register with the lenses L").

Tangen does not disclose a nano-imaging appratus comprising optical elements in a nanometer scale having more than one pixel per optical element.

In the same field of endeavor Okayama discloses n the **imaging device** of the present invention, it is preferable that each output signal from a **plurality of pixels corresponding to one micro lens** be compensated by a compensation coefficient set in advance according to the distance between each of the pixels and an optical axis of the micro lens. Accordingly, it is possible to solve a problem that, in each imaging unit, an output signal intensity is reduced due to a reduction in quantity of light entering a light receiving section as the light receiving section of a pixel becomes farther from an optical axis of a corresponding micro lens. Consequently, an image with a high quality as far as a periphery thereof can be obtained (Page 2 Section 0032, a nanometer optical element is not described in the claims to mean anything else but an optical element having more than one pixel, Okayama disclose plurality of pixels corresponding to one micro lens therefore it will meet the language of the limitation).

Therefore it would have been obvious to one ordinary skilled in art at the time the invention was made to reduce the micro-camera of Tangen to nano level. The motivation to reduce the size of the camera is to be able reduce the camera to a point that can be used with many applications without sacrificing image quality and to decrease the density of the substrate and to reduce the effective optical index.

**Regarding claim 2,** Tangen in view of Okayama further discloses the nano-imaging apparatus according to claim 1, wherein the material of the individual optical elements has a property that causes them to function as lenses (Col 8 Lines 34 – 39, "The camera employs a number of optical active structures, for instance in the form of micro lenses or the lenslets L, the camera objective system being shown as an array of four such lenses L.sub.1 -L.sub.4. Each lens L generates an image of the scene to be imaged with the desired total resolution in the final image").

**Regarding claim 3,** Tangen in view of Okayama further disclose the nano-imaging apparatus according to claim 2, wherein the partly or fully radiation transmitting layer (2 or 3) comprises homogenous material or heterogeneous material, e.g. a layer consisting of fiber, spacer or a fluid or combinations thereof, being malleable by changing its volume, spacing, curvature, other shape change, or chemistry (Tangen, Col 9 Lines 23 – 28, "This surface may be plane, **curved or double-curved**. For instance the optically active structures or the lenslets L may be provided as in FIGS. 2a-2c, where FIG. 2a shows lenses L on a **curved transparent substrate S** and assigned detectors $D_n$ provided on the backside of the substrate such that they register with the lenses L" and Col 14 Lines 48 – 67, "The camera is realized as a sandwich with a large number of micro lenses 2 located in a thin flexible sheet. The latter is attached to another flexible sheet wherein the detectors $D_n$ are provided in a controlled pattern. The lens sheet may be made of a monolithic piece of plastic material wherein the lenslets are formed by plastic deformation, etching or by depositing a material on a plane substrate. Alternatively a lenslet sheet may comprise a number of individual lenslets

immobilized in a flexible, planar matrix and plastic detectors provided as arrays on flexible substrates have recently been realized based on the use of conjugated polymers. Responsively and spectral response are very good and compatible with applications which demand imaging with high quality").

**Regarding claim 4,** Tangen in view of Okayama further disclose the nano-imaging apparatus according to claim 3, wherein the functions of focusing, light filtering, optical correction or zooming are achievable by at least one of fluidic, capillary force, molecular rearrangement, chemistry, or nano-sized levers or fibers to adjust size or refractive property of the optical system (Tangen, Col 11 lines 49 – 67, talks about focusing and optical aberration correction, "the optical active structure of the lens L is given a chromatic aberration or dispersion such that light on different wavelengths .lambda..sub.1, .lambda.Sub.2 is refracted or dispersed to different image points s.sub.1 ', s.sub.2 ' in respective image planes I.sub.1, I.sub.2. In the image planes I.sub.1, I.sub.2 respective detectors D.sub.1, D.sub.2 are provided such that a detection of the optical image is obtained in two separate wavelength bands around the wavelengths .lambda..sub.1, .lambda.Sub.2. The first detector D.sub.1 must then comprise sensors which are provided such that openings or windows are formed there between in the detector D.sub.1 or otherwise the detector D.sub.1 in the areas between the sensors must be transparent for light centered around the wavelength .lambda.Sub.2 which hence reaches the detector D.sub.2, is focused to the image plane I.sub.2 and there is recorded by the sensors in the detector D.sub.2. Each of the detectors D.sub.1, D.sub.2 will hence record an under sampled image, with a sampling

factor of 0.5, such that the fields recorded by D.sub.1, D.sub.2 comprises the full sampled image of the scene recorded with the lens L").

**Regarding claim 5,** Tangen in view of Okayama further disclose the nano-imaging apparatus in accordance with claim 4, wherein the optical elements further comprise different layers of refractive material enabling radiation of different wavelengths to be manipulated during the path through the optical element to compensate for aberration effects, and wherein the material and malleability of the individual optical elements and system are capable of focusing, zooming, light filtering and optical aberration correction (Tangen, Col 11 lines 49 – 67, talks about focusing and optical aberration correction, "the optical active structure of the lens L is given a chromatic aberration or dispersion such that light on different wavelengths .lambda..sub.1, .lambda.Sub.2 is refracted or dispersed to different image points s.sub.1 ', s.sub.2 ' in respective image planes I.sub.1, I.sub.2. In the image planes I.sub.1, I.sub.2 respective detectors D.sub.1, D.sub.2 are provided such that a detection of the optical image is obtained in two separate wavelength bands around the wavelengths .lambda..sub.1, .lambda.Sub.2. The first detector D.sub.1 must then comprise sensors which are provided such that openings or windows are formed there between in the detector D.sub.1 or otherwise the detector D.sub.1 in the areas between the sensors must be transparent for light centered around the wavelength .lambda..sub.2 which hence reaches the detector D.sub.2, is focused to the image plane I.sub.2 and there is recorded by the sensors in the detector D.sub.2. Each of the detectors D.sub.1, D.sub.2 will hence record an under sampled image, with a sampling

factor of 0.5, such that the fields recorded by D.sub.1, D.sub.2 comprises the full sampled image of the scene recorded with the lens L").

**Regarding claim 6,** Tangen in view of Okayama disclose the nano-imaging apparatus according to claim 2, wherein the radiation harvesting elements (Tangen, Figure 1b Detectors $D_1 – D_4$) work as a photoelectric device that produces an electronic signal (Tangen, Col 8 Lines 59 – 65, "Totally the detectors D.sub.1 -D.sub.4 have for instance 36 non-overlapping sensor elements E which pixelate the optical image into 36 pixels. Consequently the sensor elements E also cover the whole area of the optical image such that it is detected by the detectors D.sub.1 -D.sub.4 such that the partial samples from each of the detectors D.sub.1 -D.sub.4 together forms a full sample of the image").

**Regarding claim 7,** Tangen in view of Okayama further disclose the nano-imaging apparatus according to claims 6, wherein the electronic signal produced can be monitored and/or manipulated by electronic digital processing making an electronic read-out possible (Tangen, Col 8 Lines 39 – 44, "Each lens L generates an image of the scene to be imaged with the desired total resolution in the final image. Each of the lenses a detector device is assigned with respective detectors D.sub.1 -D.sub.4 provided on a back plane P which comprises for instance a processor, a memory etc. and where on the back side of the back plane there may be provided a display V for displaying the recorded image, the display also functioning as a viewfinder").

**Regarding claim 8,** Tangen in view of Okayama further disclose the nano-imaging apparatus according to claim 7, wherein by image enhancing processing

algorithms, overlapping information from physically (geometrically) or electronically defined arrays of sensors or "sectors" one can obtain a high resolution image (Tangen, Col 8 Lines 59 – 65, "Totally the detectors D.sub.1 -D.sub.4 have for instance 36 non-overlapping sensor elements E which pixelate the optical image into 36 pixels. Consequently the sensor elements E also cover the whole area of the optical image such that it is detected by the detectors D.sub.1 -D.sub.4 such that the partial samples from each of the detectors D.sub.1 -D.sub.4 together forms a full sample of the image").

**Regarding claim 9,** Tangen in view of Okayama further disclose the nano-imaging apparatus according to claim 8, wherein since each of the lenses has a slightly different spatial viewpoint, the multiple information from electronically or geometrically defined multiple sectors of the array of sensors can be processed to obtain 3-D or stereotypic images (Col 14, Lines 49 – 67 to Col 15 Lines 1 – 2, The camera is realized as a sandwich with a large number of micro lenses 2 located in a thin flexible sheet. The latter is attached to another flexible sheet wherein the detectors $D_n$ are provided in a controlled pattern. The lens sheet may be made of a monolithic piece of plastic material wherein the lenslets are formed by plastic deformation, etching or by depositing a material on a plane substrate. Alternatively a lenslet sheet may comprise a number of individual lenslets immobilised in a flexible, planar matrix. Plastic detectors provided as arrays on flexible substrates have recently been realized based on the use of conjugated polymers. Responsivity and spectral response are very good and compatible with applications which demand imaging with high quality. The sandwich construction which realizes the camera may be attached to either plane and/or curved

surfaces, for instance for use in areas of surveillance. By for instance curving the sandwich structure into a cylinder, an image field of 360.degree. may be obtained, which will make a mechanical pan function superfluous).

**Regarding claim 10,** Tangen in view of Okayama further disclose the nano-imaging apparatus according to claim 2, further comprising at least one shutter layer (Col 14, Line 51 Thin flexible sheet), wherein said apparatus is barely visible to ordinary vision or incorporated into either large, micro-sized or nano-sized devices (Col 14, Lines 49 – 67, The device of Tangen is micro sized camera therefore the shutter layer is barely visible to ordinary vision).

**Regarding claim 11,** Tangen in view of Okayama further disclose the nano-imaging apparatus according to claim 1, wherein all elements of the imaging apparatus are made out of flexible materials (Col 14, Lines 49 – 67, Flexible Micro lens camera).

**Regarding claim 12,** Tangen in view of Okayama further disclose the nano-imaging apparatus in accordance with claim 1, wherein the optical elements are arranged cylindrically as on a flexible tape, or spherically to obtain wide angle views (Col 14, Lines 49 – 67 to Col 15 Lines 1 – 2, The camera is realized as a sandwich with a large number of micro lenses 2 located in a thin flexible sheet. The latter is attached to another flexible sheet wherein the detectors $D_n$ are provided in a controlled pattern. The lens sheet may be made of a monolithic piece of plastic material wherein the lenslets are formed by plastic deformation, etching or by depositing a material on a plane substrate. Alternatively a lenslet sheet may comprise a number of individual lenslets immobilised in a flexible, planar matrix. Plastic detectors provided as arrays on flexible

substrates have recently been realized based on the use of conjugated polymers. Responsivity and spectral response are very good and compatible with applications which demand imaging with high quality. The sandwich construction which realizes the camera may be attached to either plane and/or curved surfaces, for instance for use in areas of surveillance. By for instance curving the sandwich structure into a cylinder, an image field of 360.degree. may be obtained, which will make a mechanical pan function superfluous).

**Regarding claim 13,** Tangen in view of Okayama further disclose the nano-imaging apparatus according to claim 1, further comprising a wide angle view detector having a sensor array curved in a 2-dimensional fashion combined with stitching the information together to thereby produce up to 360 degree panoramic imaging (Col 14, Lines 49 – 67 to Col 15 Lines 1 – 2, The camera is realized as a sandwich with a large number of micro lenses 2 located in a thin flexible sheet. The latter is attached to another flexible sheet wherein the detectors $D_n$ are provided in a controlled pattern. The lens sheet may be made of a monolithic piece of plastic material wherein the lenslets are formed by plastic deformation, etching or by depositing a material on a plane substrate. Alternatively a lenslet sheet may comprise a number of individual lenslets immobilised in a flexible, planar matrix. Plastic detectors provided as arrays on flexible substrates have recently been realized based on the use of conjugated polymers. Responsivity and spectral response are very good and compatible with applications which demand imaging with high quality. The sandwich construction which realizes the camera may be attached to either plane and/or curved surfaces, for instance for use in

areas of surveillance. By for instance curving the sandwich structure into a cylinder, an image field of 360.degree. may be obtained, which will make a mechanical pan function superfluous).

**Regarding claim 14,** Tangen in view of Okayama further disclose the nano-imaging apparatus according to claim 1, further comprising a wide angle view detector having a sensor array spheарized in a 3-dimensional fashion combined with stitching the information together thereby producing a full 360 degree imaging capability in all 3-dimensions in "fisheye", circular, rectilinear, or other fat map projections (Col 14, Lines 49 – 67 to Col 15 Lines 1 – 2, The camera is realized as a sandwich with a large number of micro lenses 2 located in a thin flexible sheet. The latter is attached to another flexible sheet wherein the detectors $D_n$ are provided in a controlled pattern. The lens sheet may be made of a monolithic piece of plastic material wherein the lenslets are formed by plastic deformation, etching or by depositing a material on a plane substrate. Alternatively a lenslet sheet may comprise a number of individual lenslets immobilised in a flexible, planar matrix. Plastic detectors provided as arrays on flexible substrates have recently been realized based on the use of conjugated polymers. Responsivity and spectral response are very good and compatible with applications which demand imaging with high quality. The sandwich construction which realizes the camera may be attached to either plane and/or curved surfaces, for instance for use in areas of surveillance. By for instance curving the sandwich structure into a cylinder, an image field of 360.degree. may be obtained, which will make a mechanical pan function superfluous).

**Regarding claim 15,** Tangen in view of Okayama further disclose the nano-imaging apparatus according to claim 2, wherein color imaging and spectroscopic imaging are achieved by utilizing equal-sized lenses and using multi-wavelength sensing layers below the lenses (Col 12, Lines 15 – 38 " Each detector is realized with 27 sensor elements and altogether the detector D.sub.1, D.sub.2, D.sub.3 are made with 81 sensor elements, such that full pixel number for the optical image which is imaged by the lens L and detected by the detectors D.sub.1, D.sub.2, D.sub.3 is 81. For each of the wavelengths .lambda..sub.1, .lambda..sub.2, .lambda..sub.3 it is then with the lens L and the three detectors D.sub.1, D.sub.2, D.sub.3 obtained a sampling of the optical image with the sampling factor of 1/3. The full sample RGB image will hence require three lenses with detectors provided as shown in FIG. 9a. Advantageously the detector D.sub.1 in the area which is not covered by the sensor elements as shown in FIG. 9b may be made in a material which is transparent to light on the wavelengths .lambda..sub.2, .lambda..sub.3. Light on the wavelength .lambda..sub.2 will hence pass through and be focused to the image plane I.sub.2 where the detector D.sub.2 is provided. The detector D.sub.2 is preferably correspondingly made in a material which is transparent for light on the wavelength .lambda.sub.3 such that light on this wavelength may pass through the detector D.sub.2 where it is not covered by the sensor element and be focused to the image plane I.sub.3 where D.sub.3 is provided").

**Regarding claim 16,** Tangen in view of Okayama further disclose the nano-imaging apparatus according to claim 2, wherein spectroscopic imaging and/or spectroscopy can be achieved by taking advantage of the optical properties of nano-

scaled lenses by controlling the diameter of the lenses at a nanometer level thereby accepting various wavelengths below the diffraction limit (Col 10 Lines 11 – 30, "For the miniature lenses one has typically w≥0.5 μm. The minimum size of sensor elements in this area may easily be adapted to the present technology for electronic array cameras. The distance between the pixels in the electronic cameras lies typically in the range of 5 μm and above. This may be compared with the required dimensions for the image, viz. $n_x$.w in the x direction and $n_y$ x w the y direction, which for a picture with one million pixels and $n_x$ = $n_y$ =1000 becomes 500 μm.multidot.500 μm or more. Assuming that the light-sensitive areas of the sensor elements may be positioned with a mutual distance of for instance 10 μm, each lens may accommodate 50×50=2500 pixels and the minimum number of lenses which is necessary becomes 400. In a quadratic lens array this implies 20×20 lenses").

**Regarding claim 17,** Tangen in view of Okayama further disclose the nano-imaging apparatus according to claim 16, wherein stepwise-sized lenses with gradually increasing/decreasing diameter are employed by utilizing processing to remove the cumulative component of the incrementally larger lenses (Col 10 Lines 11 – 30, "For the miniature lenses one has typically w≥0.5 μm. The minimum size of sensor elements in this area may easily be adapted to the present technology for electronic array cameras. The distance between the pixels in the electronic cameras lies typically in the range of 5 μm and above. This may be compared with the required dimensions for the image, viz. $n_x$.w in the x direction and $n_y$ x w the y direction, which for a picture with one million pixels and $n_x$ = $n_y$ =1000 becomes 500 μm.multidot.500 μm or more. Assuming that the

light-sensitive areas of the sensor elements may be positioned with a mutual distance of for instance 10 μm, each lens may accommodate 50×50=2500 pixels and the minimum number of lenses which is necessary becomes 400. In a quadratic lens array this implies 20×20 lenses").

**Regarding claim 18,** Tangen in view of Okayama further disclose the nano-imaging apparatus according to claim 17, wherein the smallest diameter lens is capable of admitting only the UV-light waves and the largest diameter lens admitting all wavelengths up to IR-radiation (Col 10 Lines 11 – 30, "For the miniature lenses one has typically w≥0.5 μm. The minimum size of sensor elements in this area may easily be adapted to the present technology for electronic array cameras. The distance between the pixels in the electronic cameras lies typically in the range of 5 μm and above. This may be compared with the required dimensions for the image, viz. $n_x$.w in the x direction and $n_y$ x w the y direction, which for a picture with one million pixels and $n_x$ = $n_y$ =1000 becomes 500 μm.multidot.500 μm or more. Assuming that the light-sensitive areas of the sensor elements may be positioned with a mutual distance of for instance 10 μm, each lens may accommodate 50×50=2500 pixels and the minimum number of lenses which is necessary becomes 400. In a quadratic lens array this implies 20×20 lenses").

**Regarding claim 19,** Tangen in view of Okayama further disclose the nano-imaging apparatus according to claim 16, wherein color imaging can be achieved by controlling the diameter of a limited set of two or more lenses at a nanometer level (Col 10 Lines 11 – 30, "For the miniature lenses one has typically w≥0.5 μm. The minimum size of sensor elements in this area may easily be adapted to the present technology for

electronic array cameras. The distance between the pixels in the electronic cameras lies typically in the range of 5 μm and above. This may be compared with the required dimensions for the image, viz. $n_x$.w in the x direction and $n_y$ x w the y direction, which for a picture with one million pixels and $n_x$ = $n_y$ =1000 becomes 500 μm.multidot.500 μm or more. Assuming that the light-sensitive areas of the sensor elements may be positioned with a mutual distance of for instance 10 μm, each lens may accommodate 50×50=2500 pixels and the minimum number of lenses which is necessary becomes 400. In a quadratic lens array this implies 20×20 lenses").

**Regarding claim 20,** Tangen in view of Okayama further disclose the nano-imaging apparatus according to claim 19, wherein lenses with different diameters are utilized to detect discrete wavelengths which subsequently are additively combined to produce a color-code necessary for standard (e.g. RGB, CMYK) or false color processing (Tangen Col 10 Lines 11 – 30, "For the miniature lenses one has typically w≥0.5 μm. The minimum size of sensor elements in this area may easily be adapted to the present technology for electronic array cameras. The distance between the pixels in the electronic cameras lies typically in the range of 5 μm and above. This may be compared with the required dimensions for the image, viz. $n_x$.w in the x direction and $n_y$ x w the y direction, which for a picture with one million pixels and $n_x$ = $n_y$ =1000 becomes 500 μm.multidot.500 μm or more. Assuming that the light-sensitive areas of the sensor elements may be positioned with a mutual distance of for instance 10 μm, each lens may accommodate 50×50=2500 pixels and the minimum number of lenses which is necessary becomes 400. In a quadratic lens array this implies 20×20 lenses").

**Regarding claim 21,** Tangen in view of Okayama further disclose the nano-imaging apparatus according to claim 7, wherein the electronic read-out signal is electronically processed in multiple ways, including by delivery to further imbedded processing and storage circuitry, or to deliver information to a separate or remote device, which in itself stores information for that can be observed, stored and/or redelivered/re-broadcast (Tangen, Col 8 Lines 39 – 44, "Each lens L generates an image of the scene to be imaged with the desired total resolution in the final image. Each of the lenses a detector device is assigned with respective detectors D.sub.1 - D.sub.4 provided on a back plane P which comprises for instance a processor, a memory etc. and where on the back side of the back plane there may be provided a display V for displaying the recorded image, the display also functioning as a viewfinder").

4. **Claims 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tangen et al. (US 6,765,617 B1) cited by applicant in view of Okayama (US 5, 973,844 A).**

**Regarding claim 22 and 23,** Tangen in view of Okayama disclose the nano-imaging apparatus according to claim 1, Tangen and Okayama does not disclose wherein multiple of said apparatuses are distributed in space and in communication with each other and/or a central processor enabling retrieval of multiple information, wherein said information can be assembled interferometrically or to create multiple viewpoints seeing around obstacles, wherein said multiple of said apparatuses are employable as

a tracking device enabling full 3-dimensional capability as well as a "measurement station" making true 3-dimensional metric determination of an unknown object.

Official notice is hereby taken that is well know to distribute imaging device in space and communication with each other to retrieve information and employed as a tracking device enabling full 3-dimention capability and determining an object.

Therefore it would have been obvious to one ordinary skilled in the art at the time the invention was made to distribute Tangen and Okayama imaging device in a space to acquire a full dimensional image of an object. The motivation to do so is to enable the imaging appratus user the ability to acquire images far from human and to give the user a realistic picture of an object.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

***Contacts***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SELAM GEBRIEL whose telephone number is (571)270-1652. The examiner can normally be reached on Monday - Friday 8:30 - 5:00. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sinh Tran can be reached on (571)272-7564. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/SELAM GEBRIEL/
Examiner, Art Unit 2622

Saturday, December 05, 2009

/TUAN HO/
Primary Examiner, Art Unit 2622